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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/031,542	01/18/2002	Christoph Gebhardt	113737.7	6594

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EXAMINER	
JOHNSTON, PHILLIP A	

ART UNIT	PAPER NUMBER
2881	

DATE MAILED: 11/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/031,542	GEBHARDT ET AL.	
	Examiner	Art Unit	
	Phillip A Johnston	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 July 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *22-52* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *22-52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Detailed Action

1. This Office Action is submitted in response to Amendment dated 7-27-2004, wherein claim 28 has been corrected. Claims 22-52 are pending.

Claims Rejection – 35 U.S.C. 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 22-52 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,378,499 to Spangler, in view of Kublak, U.S. Patent No. 5,577,092.

Spangler (499) discloses an ion mobility detector utilizing surface interactions to improve detector response that includes;

(a) Loading neutral sample molecules in a carrier by impinging them onto a metal surface having a reactant species, and fragmenting the collisionally reacted cluster, as recited in claims 22, 40,43, 46 and 49. See Column 3, line 30-42.

(b) Impinging neutrals on coated solid surfaces to initiate reactions, as recited in claims 24,26,28,31,39,45, and 48. See Column 5, line 5-36, and line 58-65.

c) Fragmenting chemically converted samples through excitation, as recited in claims 26, and 36. See Column 4, line 11-23.

(d) Utilizing alkali atoms, as recited in claim 30. see Column 2, line 21-45.

(e) The use of reactive surfaces coated with an acid or base material, as recited in claims 32, and 33. See Column 4, line 49-66.

It is implied herein that the coating surface density of Spangler (499) has a predetermined temporal average, as recited in claims 41,44 and 50.

Spangler (499) as applied above fails to teach the use of a supersonic nozzle to form clusters, as recited in Claim 34. However, Kublak (092) discloses that it is well known in the art to form clusters by the supersonic expansion of a gas through a nozzle. See Column 3, line 6-26.

Therefore it would have been obvious to one of ordinary skill in the art that the cluster fragmentation method of Spangler (499) can be modified to use the supersonic nozzle of Kublak (092), to provide a source of neutral sample molecules which can impinge impinged on reactive surfaces to accomplish physical or chemical conversion.

Also it is inherent in Spangler (499), as particularly shown in figure 3, that when interferent molecules entrained in the carrier gas strike the surface and undergo surface reaction, they do so at a glancing angle of incidence, as recited in Claim 38.

Examiners Response to Arguments

4. Applicant's arguments filed 7-27-2004 have been fully considered but they are not persuasive.

Arguments 1 and 2.

Applicant states that "Applicants' patent application discloses a novel ionization mechanism that allows converting neutral particles into ionized particles. On the other hand, Spangler discloses methods to tailor the identity of existing ions to experimental needs. The two methods are different and have no common objective. It is not true that by simply adding a supersonic nozzle to the setup of Spangler applicants' ionization method can be obtained, since the physical conditions inside the ion mobility spectrometer are incompatible with cluster formation by adiabatic expansion.

Applicants therefore respectfully submit that the present claims are not obvious. The references cited by the Examiner are based on physical phenomena distinct from those of the present claims. The Kublak invention cannot be combined with the Spangler invention without the Kublak invention being rendered satisfactory for its intended purpose. There is no motivation in the cited references to combine them to produce the invention defined by the present claims."

The applicant is respectfully directed to Spangler (499), Column 1, line 20-43, which states; More particularly, a typical ion mobility detector is comprised of a combined ionization source and an ion reaction region, an ion drift region and an ion injection shutter or grid interposed between the ion reaction region and the ion drift

region. A carrier gas, normally purified air or nitrogen, transports sample vapor of a material whose identity is to be characterized into the ion reaction region so that the gaseous mixture is exposed to the ionization source. Portions of both the carrier gas and the sample are directly ionized by the ionization source. However, as known to those practicing in this art, the characteristics of the carrier gas and the sample are usually such that the molecules of the carrier gas are more easily directly ionized by the ionization source than are the molecules of the sample. Since the mean free path of the carrier gas and sample is many times smaller than the dimensions of the reaction region there are multiple collisions between the molecules of the carrier and sample gases. As also known to those skilled in the art, the tendency of these collisions is to transfer the ion charge from the carrier molecules to the sample molecules, thereby ionizing the sample gas mainly by this secondary ionization process.

The applicant is also respectfully directed to a secondary reference to define the term secondary ionization disclosed above in Spangler (499). See for example, Hartley, U.S. Patent Pub. No. 2003/0136918, paragraphs [0002] and [0031], which state [0002] Ionization of gaseous molecules is conventionally initiated by photon bombardment, charged particle impact, ultraviolet radioactive ionization, or by thermal electron beams. Such ionization techniques are typically utilized for mass spectrometers and ion mobility spectrometers. During ionization, depending on the level of impact energy, one of two events occur, either electrons are ejected from atoms and molecules or the molecules themselves are fractured into complement of

fragments with diverse charge states. These processes are known as hard ionization and while they can be utilized to provide a measurement indicative of the atoms and molecules contained within the ionized sample, many components cannot be measured. Further, these `hard` ionization mechanisms are inefficient with approximately 0.1% of atoms or molecules ionized. In addition, conventional mass spectrometers require low pressure ("hard vacuum") to operate to prevent higher velocity ions from colliding with a slower moving atoms and molecules (thermal velocities) that, during passage through the spectrometer, attenuate ion currents below detectable limits. Unlike conventional systems that operate under millitorr level vacuum where molecules are still subject to collision, the molecules within the unipolar plasma described herein include fewer slow moving (verses dominant proportion) neutral target molecules to collide with faster traveling ions nor does are there free electrons to neutralize ions (in fact, the unipolar ions repel each other further reducing the likelihood of collision). In addition, a system that generates unipolar plasma may also include a series of detection elements that are able to characterize the masses of all molecules contained with the plasma to determine relative concentrations. Accordingly, unlike previous systems that suffer from hard ionization effects and secondary ionization, the current system provides plasma substantially free of electrons or other differentially ionized molecules.

The applicant is also respectfully directed to an additional secondary reference used herein to help define the term secondary ionization disclosed above in Spangler (499). See for example, Spangler (624), Column 3, line 5-17, which states; For the

$(H_2O)_n H^+$ reactant ion conventionally used in ion mobility spectrometry,it has been shown that organophosphorous compounds,such as dimethylmethylphosphonate (DMMP), are ionized according to:

$$(H_2O)_n H^+ + DMMP \rightarrow (DMMP) H^+ + n(H_2O)$$

when n is small, i.e. n=4 or 5.

Additionally, cluster reactions can take place to yield:

$$M + MH^+ \leftarrow \rightarrow .M_2 H^+$$

where $M_2 H^+$ is the dimer ion.

The examiner has interpreted from the references above that collision induced secondary ionization is a method of cluster and fragment production well known to Spangler (499). Also the use of reaction partners, and the bombardment of coated surfaces for ion production in accordance with Spangler (499) is equivalent to the physical phenomena relied upon in the claimed invention.

In response to Applicant's argument that there is no suggestion to combine the references, the Examiner recognizes that references cannot be arbitrarily combined and that there raust be some reason why one skilled in the art would be motivated to make the proposed combination of primary and secondary references. In re Nomiya, 184 USPQ 607 (CCPA 1975). However, there is no requirement that a motivation to make the modification be expressly articulated. The test for combining references is what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art. In re McLaughlin, 170 USPQ 209 (CCPA 1971) references are

evaluated by what they suggest to one versed in the art, rather than by their specific: disclosures. In re Bozek, 163 USPQ 545 (CCPA 1969).

In this case, the examiner has utilized the Kublak (092) reference only to establish that methods of forming clusters by supersonic expansion through a nozzle, as recited in claim 34, were well known in the art, and available to the public at the time the applicant's invention was made.

In addition the examiner has interpreted from the references above that, owing to their extensive knowledge of vacuum systems, one of ordinary skill in the art of ionization sources would have been motivated to utilize the appropriate vacuum system to combine the cluster forming nozzle of Kublak (092) with the input filter of Spangler (499) to provide molecular clusters of compounds to be analyzed, depending upon the physical and/or chemical properties of interest.

Conclusion

5. The Amendment filed on 7-27-2004 under 37 CFR 1.131 has been considered but is ineffective to overcome the Spangler (499) and Kublak (092) references.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (571) 272-2475. The examiner can normally be reached on Monday-Friday from 7:30 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor John Lee can be reached at (571) 272-2477. The fax phone number for the organization where the application or proceeding is assigned is 703 872 9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PJ
October 20, 2004

JOHN R. LEE
SUPERVISORY PATENT EXAMINER
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